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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,755	06/24/2003	Zhen Yu Yang	CL1459 USDIV	9985
23906	7590	01/05/2006	EXAMINER	
E I DU PONT DE NEMOURS AND COMPANY LEGAL PATENT RECORDS CENTER BARLEY MILL PLAZA 25/1128 4417 LANCASTER PIKE WILMINGTON, DE 19805			HU, HENRY S	
			ART UNIT	PAPER NUMBER
			1713	

DATE MAILED: 01/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/602,755	YANG, ZHEN YU	
	Examiner	Art Unit	
	Henry S. Hu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment of November 22, 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4-8 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-8 and 13-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to faxed Amendment filed on November 22, 2005.

Claims 4 and 13 were amended, Claims 16-17 as well as non-elected Claims 9-12 (group II) were both cancelled, Claims 1-3 were previously cancelled, while no new claim was added. To be more specific, both parent **Claims 4 and 13** were only amended to have proper "**n >= 1**" as pointed out by the Examiner in claim objections. In a close examination, all claims carry "**exactly the same**" scope of original limitations since claim amendment is only cosmetic.

With respect to specification objections (a) - (d), the Applicants have made all the necessary corrections as pointed out by the Examiner. In view of above amendment, the examiner thereby withdraws specification objections and claim objections. Applicants' correction on **Claim 13** at lines 5-6 for the indefinite wording on "less than ca. 12" is still improper in view of new wording of "less than about 12". Same problem on 112-2nd rejection exists according to MPEP. **Claims 4-8 and 13-15 are now pending** with two independent claims (Claim 4 and Claim 13) and also with **species election being -N⁻(M⁺)SO₂R_f on X**. An action follows.

Response to Argument

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2. Applicant's argument filed on November 22, 2005 has been fully considered but they are not persuasive. The focal arguments related to the patentability will be addressed as follows: In view of the Applicants' argument on pages 13-14 of Remarks, the 103(a) rejection is sustained.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

On **Claim 13** at lines 5-6, newly submitted phrase of “**less than about 12**” is still vague and indefinite. **It may still mean a number below the level of 12+ or 12-**. Therefore, one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. The examiner insists that it should be **rewritten** clearly with a phrase such as “**less than 12**”.

Claim Rejections - 35 USC § 103

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4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. *The limitation of parent Claim 4 relates to a polymer comprising monomer units of VF_2 and 1-40 mol % of ionic monomer units of $CH_2=CH-(CF_2)_{2n}-O-CF_2-CF_2-SO_2-X$ where $n \geq 1$, X is OM^+ , or $N(M^+)SO_2R_f$ where M^+ is H^+ or an alkali metal cation, and R_f is C1-4 perfluoroalkyl optionally substituted by one or more ether oxygen atoms. Parent Claim 13 relates to a process of making $CH_2=CH-(CF_2)_{2n}-O-CF_2-CF_2-SO_3^-M^+$ (where M^+ is H^+ or an alkali metal cation) from $CH_2=CH-(CF_2)_{2n}-O-CF_2-CF_2-SO_2-F$ with a base. See other limitations of dependent Claims 5-8 and 13-15.*

6. Claims 4-8 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drysdale et al. (WO 98/31716) in view of Howells et al. (WO 97/23448) and Krespan (US

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4,349,650) for the reasons set forth in **paragraphs 7-10 of office action dated 10-27-2005 as well as the discussion below.**

7. **Applicants:** Applicants have claimed in parent **Claim 4** an unexpected way of obtaining an ionic fluoropolymer comprising **VF₂** and ionic monomer (1-40 mol%) of **CH₂=CH-(CF₂)_{2n}-O-CF₂-CF₂-SO₂-X** where $n \geq 1$, **X is O⁻M⁺, or N⁻(M⁺)SO₂R_f** where **M⁺ is H⁺ or alkali metal cation**, and **R_f is C1-4 perfluoroalkyl optionally substituted by one or more oxygen atoms.** Other parent **Claim 13** relates to a process of making **CH₂=CH-(CF₂)_{2n}-O-CF₂-CF₂-SO₃⁻M⁺** (where **M⁺ is H⁺ or alkali metal cation**) **from CH₂=CH-(CF₂)_{2n}--O-CF₂-CF₂-SO₂-F with a base.**

With respect to 103 rejection over Drysdale in view of Howells and Krespan, the Applicants allege the primary reference **Drysdale** only discloses grafting the **CH₂=CH-(CF₂)₂--O-CF₂-CF₂-SO₂-F** monomer to a polymer such as polyether or an ethylene polymer. The key point is that secondary reference **Krespan** may have disclosed that various types of monomers can be copolymerized with **VF₂**; **all of which are fluorinated on the alpha carbon** as well as **does not include any ionic monomer at all.** Other secondary reference **Howells** may have taught the conversion of **CH₂=CH-(CF₂)₂--O-CF₂-CF₂-SO₂-F** to the imide salt of **-SO₂-N⁻(M⁺)SO₂R_f**; he cannot fix such a deficiency from Drysdale/Krespan. Therefore, a motivation to link is lacking; even Drysdale and Howells can be in combination they cannot teach or suggest current application in making **VF₂** copolymer (see page 13 middle section of Remarks).

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8. Applicants further allege that Krespan's monomers (to be copolymerized with VF_2) are fluorinated on the alpha carbon such as $\text{CF}_2=\text{CF}-$, which is quite different from instant application's $\text{CH}_2=\text{CH}-$ (see page 13 bottom section of Remarks).

Regarding the rejection of parent **Claim 13**, Drysdale and Krespan each only discloses the claimed modification of the sulfonyl fluoride end group after the monomer has been grafted to the base polymer (see Drysdale's working examples). However, Claim 13 is a composition containing the claimed "monomer". Therefore, a motivation to link is lacking.

9. **Examiner:** In view of amendment, all pending claims carry "exactly the same" scope of original limitations since amendment is only cosmetic. As discussed in earlier non-final office action for parent **Claim 4**, primary reference **Drysdale** has already disclosed the preparation of the monomer of $\text{CH}_2=\text{CH}-(\text{CF}_2)_2--\text{O}-\text{CF}_2-\text{CF}_2-\text{SO}_2-\text{F}$ and its grafting to some polymer such as polyethylene or ethylene-containing polymer. Therefore, Drysdale is silent about two things as following: (A) the conversion of $\text{CH}_2=\text{CH}-(\text{CF}_2)_2--\text{O}-\text{CF}_2-\text{CF}_2-\text{SO}_2-\text{F}$ to the imide salt of $-\text{SO}_2-\text{N}^+(\text{M}^+)\text{SO}_2\text{R}_f$, and (B) copolymerizing such a imide-containing monomer with vinylidene fluoride (VF_2).

Secondary reference **Howells** has taught the method of such a conversion by starting with $-\text{SO}_2-\text{F}$ containing monomer and $\text{R}_f\text{SO}_2\text{NH}_2$ into a lithium salt of imide and then forming the copolymers. Attention is directed to working examples in page 19, line 26 – page 21, line 9; abstract, line 4-5; page 20, line 16 for $\text{CF}_3\text{SO}_2\text{NH}_2$; particularly see page 8 at lines 28 and 31 for

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the chemical equivalence of $\text{CH}_2=\text{CH}-$ and $\text{CF}_2=\text{CF}-$. By doing so, such a copolymer may be useful in making battery electrolytes with decreased corrosion (page 1, line 22-31).

10. With respect to key argument on “**all of Krespan’ monomers do not include any ionic monomer at all**”, attention is directed to column 11, line 60 – column 12, line 28 regarding the conversion of pendant $-\text{SO}_2\text{F}$ or $-\text{COF}$ groups in the copolymer by hydrolysis to $-\text{SO}_2\text{-OH}$ or $-\text{COOH}$ groups. It is noted that parent Claim 4 is related to an ionic polymer bearing such a pendant ionic groups.

With respect to key argument on “Krespan’s monomers (which are to be copolymerized with VF_2) are fluorinated on the alpha carbon such as $\text{CF}_2=\text{CF}-$ ”, attention is directed to column 11 at lines 28-68 that $-\text{SO}_2\text{F}$ or $-\text{COF}$ group-containing monomer is found to be effectively copolymerized with monomers carrying $\text{CH}_2=\text{CH}-$ and/or $\text{CF}_2=\text{CF}-$ (particularly see lines 35-38); such a behavior is commonly known in the art.

11. With respect to key argument on “a composition containing monomer” limitation of parent **Claim 13** as pointed out by the Applicants, Drysdale and Krespan each has already disclosed the conversion of $\text{CH}_2=\text{CH}-(\text{CF}_2)_2-\text{O}-\text{CF}_2-\text{CF}_2-\text{SO}_2-\text{F}$ containing polymer to its form of sulfonic acid and its potassium salt by using $\text{KOH}/\text{THF}/\text{water}$. In a close examination, “polymer” can be still treated as a structural “composition” of “monomer(s)” although the individual property of monomer(s) may not totally (but at least some) show up in polymer due to the difference in molecular weight.

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In summary, one having ordinary skill in the art would have found it obvious to modify Drysdale's monomer of $\text{CH}_2=\text{CH}-(\text{CF}_2)_2-\text{O}-\text{CF}_2-\text{CF}_2-\text{SO}_2-\text{F}$ to the imide salt of $-\text{SO}_2-\text{N}^-(\text{M}^+)\text{SO}_2\text{R}_f$ before or after its copolymerization with vinylidene fluoride (VF_2) monomer as taught by both Howells and Krespan so that such obtained copolymer may be useful in making battery electrolytes with decreased corrosion. Therefore, **103 rejection stands** with the same ground of reasons. In order to be possibly distinguished from prior art in such a 103 rejection, Applicants may need to show at least some "**unexpected results**" with comparative example(s).

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The **fax** number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Henry S. Hu

Patent Examiner, art unit 1713, USPTO

December 29, 2005



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